

CLAIMS

1. A repeater device that receives from an adjacent
repeater device a signature for controlling a passage of a
packet and sends the signature received to another adjacent
5 repeater device, wherein the repeater device
determines whether to send the signature to the
another adjacent repeater device based on the signature
received from the adjacent repeater device, and
sends the signature received from the adjacent
10 repeater device to the another adjacent repeater device
when the repeater device determines that the signature is
to be sent to the another adjacent repeater device.
2. The repeater device according to claim 1, further
15 comprising:
an attack presence determining unit that monitors
whether there is a packet that satisfies a condition of the
signature received from the adjacent repeater device, and
determines whether there is an attack by the packet; and
20 a signature sending unit that sends the signature
received from the adjacent repeater device to the another
adjacent repeater device when the attack presence
determining unit determines that there is an attack.
- 25 3. The repeater device according to claim 2, wherein
the attack presence determining unit includes a packet
number determining unit that determines whether a number of
packets that satisfy a condition of the signature received
from the adjacent repeater device within a unit time
30 exceeds a predetermined threshold, and
the signature sending unit sends the signature
received from the adjacent repeater device to the another
adjacent repeater device when the packet number determining

unit determines that the number of packets within the unit time exceeds the predetermined threshold.

4. The repeater device according to claim 3, wherein
5 when the packet number determining unit determines that the number of packets within the unit time exceeds the predetermined threshold, the attack presence determining unit further includes a continuous exceeding number determining unit that determines whether a number of times
10 that the predetermined threshold is continuously exceeded exceeds a predetermined value, and
the signature sending unit sends the signature received from the adjacent repeater device to the another adjacent repeater device when the continuous exceeding
15 number determining unit determines that the number of times exceeds the predetermined value.

5. The repeater device according to claim 2, 3, or 4, wherein the signature sending unit sends the signature to
20 another adjacent repeater device other than the adjacent repeater device from which the signature is received among all adjacent repeater devices.

6. The repeater device according to claim 1, further
25 comprising:

a signature storage unit that stores the signature received;

a signature registration determining unit that determines whether the signature received from the adjacent
30 repeater device is already registered in the signature storage unit; and

a signature communicating unit that registers the signature received from the adjacent repeater device in the

signature storage unit when the identification information determining unit determines that the signature is not yet registered, and sends the signature to the another adjacent repeater device.

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7. The repeater device according to claim 6, wherein the signature storage unit stores the signature in correspondence with generation identification information that uniquely identifies each signature generated,

10 the signature registration determining unit determines whether generation identification information of the signature received from the adjacent repeater device is already registered in the signature storage unit, and

the signature communicating unit registers the
15 signature and the generation identification information received from the adjacent repeater device in the signature storage unit when the signature registration determining unit determines that the generation identification information is not yet registered in the signature storage
20 unit, and sends the signature and the generation identification information received to the another adjacent repeater device.

8. The repeater device according to claim 7, further comprising:
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a signature generating unit that generates, when a suspicious attacking packet is detected, a signature and generation identification information of the signature, wherein

30 the signature generating unit sends the signature and the generation identification information to the another adjacent repeater device, and registers relay destination information that specifies an adjacent repeater device that

is a relay destination, the generation identification information, and the signature in correspondence with each other in the signature storage unit.

5 9. The repeater device according to claim 8, wherein
when the signature registration determining unit
determines that the generation identification information
of the signature received from the adjacent repeater device
is not yet registered in the signature storage unit, the
10 signature communicating unit sends the signature and the
generation identification information received from the
adjacent repeater device to the another adjacent repeater
device, and registers relay source information that
specifies an adjacent repeater device that is a relay
15 source immediately before the signature, relay destination
information that specifies an adjacent repeater device that
is a relay destination immediately after the signature, the
generation identification information, and the suspicious
signature in correspondence with each other in the
20 signature storage unit,

the signature registration determining unit further
determines, when the generation identification information
of the signature received from the adjacent repeater device
is already registered in the signature storage unit,
25 whether relay source information registered in
correspondence with the generation identification
information is same as relay source information of the
signature received from the adjacent repeater device, and
when the signature registration determining unit
30 determines that the generation identification information
is already registered in the signature storage unit but the
relay source information of the signature received is same
as the relay source information registered, the signature

communicating unit registers the signature received from the adjacent repeater device over the signature registered in the signature storage unit, and sends the signature received to another adjacent repeater device indicated by
5 the relay destination information registered in the signature storage unit.

10. The repeater device according to claim 9, wherein the signature communicating unit returns, when the
10 signature registration determining unit determines that the relay source information of the signature received is different from the relay source information of the signature registered, an already registered notification indicating that the signature is already registered to the
15 adjacent repeater device that is the relay source of the signature, and
deletes, when the already registered notification is received from another repeater device, relay destination information corresponding to the adjacent repeater device
20 from the relay destination information stored in the signature storage unit.

11. A network attack protection system including a plurality of repeater devices that receives from an
25 adjacent repeater device a signature for controlling a passage of a packet and sends the signature received to another adjacent repeater device, wherein each of the repeater devices includes
an attack presence determining unit that monitors
30 whether there is a packet that satisfies a condition of the signature received from the adjacent repeater device, and determines whether there is an attack by the packet, and
a signature sending unit that sends the signature

received from the adjacent repeater device to the another adjacent repeater device when the attack presence determining unit determines that there is an attack.

5 12. A network attack protection system including a plurality of repeater devices that receives from an adjacent repeater device a signature for controlling a passage of a packet, registers the signature received in a signature storage unit, controls the passage of the packet,
10 and sends the signature received to another adjacent repeater device, wherein each of the repeater devices includes

a signature registration determining unit that determines whether the signature received from the adjacent
15 repeater device is already registered in the signature storage unit, and

a signature communicating unit that registers the signature received from the adjacent repeater device in the signature storage unit when the identification information
20 determining unit determines that the signature is not yet registered, and sends the signature to the another adjacent repeater device.

13. A relaying method performed by a repeater device that
25 receives from an adjacent repeater device a signature for controlling a passage of a packet and sends the signature received to another adjacent repeater device, the relaying method comprising:

an attack presence determining step of monitoring
30 whether there is a packet that satisfies a condition of the signature received from the adjacent repeater device, and determining whether there is an attack by the packet; and

a signature sending step of sending the signature

received from the adjacent repeater device to the another adjacent repeater device when it is determined at the attack presence determining step that there is an attack.

5 14. The relaying method according to claim 13, wherein
the attack presence determining step includes a packet
number determining step of determining whether a number of
packets that satisfy a condition of the signature received
from the adjacent repeater device within a unit time
10 exceeds a predetermined threshold, and
the signature received from the adjacent repeater
device is sent to the another adjacent repeater device at
the signature sending step when it is determined at the
packet number determining step that the number of packets
15 within the unit time exceeds the predetermined threshold.

15. The relaying method according to claim 14, wherein
the attack presence determining step further includes
a continuous exceeding number determining step of
20 determining whether a number of times that the
predetermined threshold is continuously exceeded exceeds a
predetermined value when it is determined at the packet
number determining step that the number of packets within
the unit time exceeds the predetermined threshold, and
25 the signature received from the adjacent repeater
device is sent to the another adjacent repeater device at
the signature sending step when it is determined at the
continuous exceeding number determining step that the
number of times exceeds the predetermined value.

30 16. The relaying method according to claim 13, 14, or 15,
wherein the signature is sent to another adjacent repeater
device other than the adjacent repeater device from which

the signature is received among all adjacent repeater devices at the signature sending step.

17. A relaying method for receiving from an adjacent
5 repeater device a signature for controlling a passage of a packet, registering the signature received in a signature storage unit, controlling the passage of the packet, and sending the signature received to another adjacent repeater device, wherein the relaying method includes

10 a signature registration determining step of determining whether the signature received from the adjacent repeater device is already registered in the signature storage unit, and

a signature communicating step of registering the
15 signature received from the adjacent repeater device in the signature storage unit when it is determined at the identification information determining step that the signature is not yet registered, and sends the signature to the another adjacent repeater device.

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18. The relaying method according to claim 17, wherein
the signature storage unit stores the signature in
correspondence with generation identification information
that uniquely identifies each signature generated,

25 the signature registration determining step includes determining whether generation identification information of the signature received from the adjacent repeater device is already registered in the signature storage unit, and

the signature communicating step includes registering
30 the signature and the generation identification information received from the adjacent repeater device in the signature storage unit when it is determined at the signature registration determining step that the generation

identification information is not yet registered in the signature storage unit, and sending the signature and the generation identification information received to the another adjacent repeater device.

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19. The relaying method according to claim 18, further comprising:

a signature generating step of generating, when a suspicious attacking packet is detected, a signature and generation identification information of the signature, wherein

the signature generating step includes sending the signature and the generation identification information to the another adjacent repeater device, and registering relay destination information that specifies an adjacent repeater device that is a relay destination, the generation identification information, and the signature in correspondence with each other in the signature storage unit.

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20. A relaying program that causes a computer to function as a repeater device that receives from an adjacent repeater device a signature for controlling a passage of a packet and sends the signature received to another adjacent repeater device, the relaying program causing the repeater device to execute:

an attack presence determining step of monitoring whether there is a packet that satisfies a condition of the signature received from the adjacent repeater device, and determining whether there is an attack by the packet; and

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a signature sending step of sending the signature received from the adjacent repeater device to the another adjacent repeater device when it is determined at the

attack presence determining step that there is an attack.

21. The relaying program according to claim 20, wherein
the attack presence determining step includes a packet
5 number determining step of determining whether a number of
packets that satisfy a condition of the signature received
from the adjacent repeater device within a unit time
exceeds a predetermined threshold, and
the signature received from the adjacent repeater
10 device is sent to the another adjacent repeater device at
the signature sending step when it is determined at the
packet number determining step that the number of packets
within the unit time exceeds the predetermined threshold.

22. The relaying program according to claim 21, wherein
the attack presence determining step further includes
a continuous exceeding number determining step of
determining whether a number of times that the
predetermined threshold is continuously exceeded exceeds a
20 predetermined value when it is determined at the packet
number determining step that the number of packets within
the unit time exceeds the predetermined threshold, and
the signature received from the adjacent repeater
device is sent to the another adjacent repeater device at
25 the signature sending step when it is determined at the
continuous exceeding number determining step that the
number of times exceeds the predetermined value.

23. The relaying program according to claim 20, 21, or 22,
30 wherein the signature is sent to another adjacent repeater
device other than the adjacent repeater device from which
the signature is received among all adjacent repeater
devices at the signature sending step.

24. A relaying program that causes a computer to function as a repeater device that receives from an adjacent repeater device a signature for controlling a passage of a packet, registers the signature received in a signature storage unit, controlling the passage of the packet, and sends the signature received to another adjacent repeater device, the relaying program causing the repeater device to execute:

10 a signature registration determining step of determining whether the signature received from the adjacent repeater device is already registered in the signature storage unit, and

15 a signature communicating step of registering the signature received from the adjacent repeater device in the signature storage unit when it is determined at the identification information determining step that the signature is not yet registered, and sends the signature to the another adjacent repeater device.

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25. The relaying program according to claim 24, wherein the signature storage unit stores the signature in correspondence with generation identification information that uniquely identifies each signature generated,

25 the signature registration determining step includes determining whether generation identification information of the signature received from the adjacent repeater device is already registered in the signature storage unit, and

30 the signature communicating step includes registering the signature and the generation identification information received from the adjacent repeater device in the signature storage unit when it is determined at the signature registration determining step that the generation

identification information is not yet registered in the signature storage unit, and sending the signature and the generation identification information received to the another adjacent repeater device.

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26. The relaying program according to claim 25, further comprising:

a signature generating step of generating, when a suspicious attacking packet is detected, a signature and generation identification information of the signature, wherein

the signature generating step includes sending the signature and the generation identification information to the another adjacent repeater device, and registering relay destination information that specifies an adjacent repeater device that is a relay destination, the generation identification information, and the signature in correspondence with each other in the signature storage unit.